Sheet classification : RESTRICTED

National Aeronautical Laboratory	**Documentation Sheet**	*Document Classification* Restricted
Title : HORIZONTAL TAIL AND FLAP EFFECTIVENESS STUDIES ON MIG-21 M AIRCRAFT MODEL		*Document No.* PD EA 9015 *Date of issue:*
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Division : Experimental Aerodynamics		*No. of copies:* 20
External participation :		*NAL Project No.* AE-9-000
Sponsor :		*Sponsor's Project No.*
Approval : Head, Experimental Aerodynamics Division		
Remarks :		
Keywords : MIG-21 M Aircraft, Flap effectiveness studies, Free stream Mach Numbers		

Abstract :

Wind tunnel tests were carried out on a 1/17 scale MIG-21 M aircraft model (with no vortex plate on the wing) with trailing edge flaps deflected at 3,6,9,12 and 15 degrees and horizontal tails set at 5,0,-5,-10 and -13 degrees. Tests covered a Mach number range of 0.5 to 1.1 and incidence range of -5 to 15 degrees. Reynolds number based on MAC varied from 3.9 to 6.3 millions. Analysis of the test data indicate the following:

1. Flap effectiveness studies show a constant value of $C_L \delta_F$ at .011 per degree ($0 < \delta_F < 15$) upto M = 0.8; $C_L \delta_F$ however decreases beyond M = 0.8 and at higher incidences.

2. Results with tail deflections show a constant value of $C_m \delta_{HT}$ at .005 per degree ($-13 < \delta_{HT} < 5$) upto C_L of 0.5 in the range of Mach numbers tested.

3. At a free stream Mach number of 0.7, results with the optimum flap deflection schedule show an increase in $(L/D)_{trim}$ of 15 percent compared to that of flap deflection zero degree. Also the increase in $(L/D)_{trim}$ for optimum flap deflection schedule is higher when compared to that obtained with vortex plate on the wing.